GIS DATABASES VMS / SMS INVENTORIES

A QUESTION OF PROCESS?

Clemson Class of 1992 - April 1996
David S. Hatch-Landscape Architect
Ashley, Uinta and Wasatch-Cache National Forests
507 25th Street, suite 103 - Ogden, Utah 84401 - (801)625-5392

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David S. Hatch
Cache Service Area Landscape Architect
Ashley, Uinta and Wasatch-Cache National Forests
507 25th Street, suite 103
Ogden, Utah 84401
(801)625-5392

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David S. Hatch
Cache Service Area Landscape Architect
Ashley, Uinta and Wasatch-Cache National Forests
507 25th Street, suite 103
Ogden, Utah 84401
(801)625-5392

Title: **GIS Databases VMS/SMS Inventories "A Question of Process"**

Abstract:

The specific audiences for this paper are Forest Service Resource Managers and Landscape Architects with a basic understanding of geographic information systems (GIS) and their potential uses in maintaining or creating inventories and management prescriptions for Forest Service Lands using the Visual Management System (VMS) and or their transition into the Scenic Management System (SMS).

The objectives of this paper are:

- *Comparison of VMS and SMS*
- *An overview of Forest, Regional, and University GIS applications developed for deriving inventories for VMS and SMS.*
- *Show the development of an Information Needs Assessment (INA) for:*
  1-Manuscripting existing Uinta National Forest inventoried Visual Quality Objects (VQOs).
  2-Using GIS to build SMS inventories.
- *Compare digitizing VMS inventories into GIS verses building SMS inventories in GIS using a cost work analysis.*

Scenic resources play a major role in how the ecosystem of a landscape is managed on the Uinta National Forest. Spatially referencing human networks and

desires using the VMS/SMS frameworks with GIS technology will show the human relationship with other biotic and abiotic communities in the landscape. This paper explores the dimensions of using GIS as a tool to help manage Forest resources, and asks what type of data the Forest should have to support scenic resource management.

Through researching the development of existing Visual Quality Objectives (VQOs) and comparing applications for deriving SMS inventories using GIS databases, a direction for the Uinta National Forest has been determined. This analysis is not unique but could be used as a framework on other forests as well.

Keywords:

Global Information System (GIS), Visual Management System (VMS), Scenic Management System (SMS), Information Needs Assessment (INA), Visual Quality Objectives (VQOs), Scenic Integrity

PURPOSE

Visual / Scenic resource managers on the Uinta National Forest are preparing to use GIS to manage the Visual / Scenic resource on the Forest in conjunction with the Forest Plan revision. We are faced with the problem of what would be the best way to implement Visual / Scenic resource data into GIS. Through researching the development of existing VMS inventories and comparing applications for deriving SMS inventories using GIS, a direction has been determined. As the a Landscape Architect, I am providing direction for Visual Resource Management / Scenery Management on the Forest and fulfilling Recreation short course requirements.

PROBLEM STATEMENT

The use of GIS as a tool in Scenery Management allows the human dimension to be spatially related to other resources. Following national direction in ecosystem management by having a Scenery Management coverage that is interactive with other resource covers in GIS will provide a basis for sound decisions on the Forest. The question is, will existing VMS/ Visual Quality Objectives (VQOs) polygons converted into SMS terms to provide the interaction needed to do true ecosystem management? Or would it be better to construct new SMS inventories using existing base resource coverages ie: digital elevation models, vegetation, streams, transportation, ecological units, seen area analysis, etc. with GIS software?

TECHNICAL ACTIVITY

As a Landscape Architect, to answer the previous questions, I have researched the differences between VMS and SMS. I have investigated how existing VMS inventories were created and analyzed ways of using GIS to construct SMS inventories. I have developed "Information Needs Assessments" (INA) which address how to incorporate both VMS and SMS inventories into GIS. And I also completed a cost analysis that compares:

A. Manuscripting and digitizing existing VMS inventories converted to SMS terms.

B. creating SMS inventories in GIS.

FINDINGS

Through my investigations I have found that the differences between VMS and SMS inventories are considerable in relationship to ecosystem management. The VMS inventories for the Uinta National Forest were created using the VIEWIT program and transferred to overlays that produced a mylar ½"=1 mile map of inventoried VQOs. If these inventoried VQOs were digitized into GIS and SMS terms were applied, the coverage would be static because it would not contain the formula of the how and from what coverages the VQOs were derived. The VQO coverage would not be able to be manipulated as a Desire Future Condition (DFC) change in the Forest.

Starting over using the SMS process built from existing resource coverage could produce an interactive result thus allowing the dynamics of ecosystem management to

be implemented.

RECOMMENDATIONS

Select a pilot area on the Forest where the SMS process can be fully implemented with other resource managers involved. Focus on input of existing scenic condition / existing scenic integrity, stream, riparian, vegetation, and transportation into a GIS data base. Using the INA for SMS, develop the strategy of how the Forest will implement SMS into GIS. Follow this process, monitor the results to verify that recommendations are viable. It is the recommendation of this paper to construct SMS inventories and direction from the Forest resource GIS database. This will provide an economical, sound and interactive coverage that will meet customer, Forest Plan revision direction and ecosystem management goals.

DISCUSSION

Problem Amplification

Recreation and visual resources play a major role in how the ecosystem of a landscape is managed on the Uinta National Forest. Spatially referencing the human networks and desires using GIS technology will show our relationship with other communities in the landscape.

In 1980 the Forest inventoried VQOs to help in managing our visual resources. It has been more than 10 years since the last update. The issues facing us are:

A. Has the public perception of the landscape changed?

B. How does management propose to manage the Forest visual resources in the future?

C. If we are going to use GIS, what data do we need to allow meaningful interaction with the public and to help us as managers administer our Forest resources?

These are just a few of the questions that forests across the nation will need to ask.

Using GIS as a tool, there is a need to have accessible, accurate, and meaningful data. The question arises as to what should be input as base data coverages. Answering this question for visual resources is the purpose of this paper.

To accomplish this task I will break this report into the following segments:

- *Comparison of VMS and SMS*
- *An overview of Forest, Regional, and University GIS applications and development for deriving inventories for VMS and SMS.*

- *Show the development of an Information Needs Assessment (INA) for:*

  1-Manuscripting existing Uinta National Forest inventoried Visual Quality Objects (VQOs).

  2-Building SMS inventories using GIS.

- *Compare digitizing VMS inventories into GIS verses constructing SMS inventories in GIS using a cost work analysis.*

Comparing VMS to SMS

According to *Landscape Aesthetics A Handbook for Scenery Management* Draft, July, 1995, page 6;

> This handbook defines a system, referred to hereafter as the Scenery Management System (SMS), for the inventory and analysis of the aesthetic values of National Forest lands. The Scenery Management System evolved from and replaces the Visual Management System (VMS) defined in Agricultural Handbook #462. While the essence of the system remains essentially intact, still supported by current research, terminology has changed and the system has been expanded to incorporate updated research findings. Conceptually, the SMS differs from the VMS in that: it increases the role of constituents throughout the inventory and planning process; and it borrows from and is integrated with the basic concepts and terminology of Ecosystem Management. The Scenery Management System provides for improved integration of aesthetics with other biological, physical, and social/cultural resources in the planning process.

See Appendix A for a table that compares the SMS and VMS processes.

Overview of GIS VMS / SMS Applications

What is available in GIS applications to derive VMS or SMS inventories? So far I haven't been able to locate a canned package that takes you through the process of either management system. But I have found some forests or individuals using GIS applications in creating inventories and management coverages. They are:

Region 8, Kisatchie National Forest,

Randy Gimblett from the University of Arizona Advanced Resource Technology Program,

Region 4, Bridger-Teton National Forest, and

Region 4, Uinta National Forest.

The degree of development varies from group to group. Region 8 Kisatchie National Forest, following the SMS process, used GIS to determine Ecological Units polygons, and using a rating system for each of the following analyzed Existing Scenic Integrity, assigned Scenic Attractiveness, defined Distance Zones and Seen Areas and assigned Concern Levels to travelways. They determined Scenic Classes, developed Alternatives and produced Landscape Character Goals and Scenic Integrity Objectives for each Alternative.

Randy Gimblett has developed a PC program to derive VMS, Variety Classes, Seen Areas, Distance Zones and proposed Visual Quality Objectives.

> The program allows the forest recreation planner and/or landscape architect to simply develop complex GIS models for the ROS and VMS systems without requiring extensive knowledge of the GIS itself. The program does, however, assume a working knowledge of the ROS and VMS systems and the resource maps that have been loaded into the GIS system. (Gimblett)

The Bridger-Teton and Uinta have developed similar programs using Unix ArcInfo software.

Although each of these groups have followed the VMS or SMS process much of the programing that they use is subjective because of their use of conditional statements or matrix that determine direction. An example would be: all slopes over 60% = "A" distinctive landscape. This statement may be true and it could also be false based on the slope being described. These are similar problems that users in the 70's had with the VIEWIT program. This does not mean that the information is wrong, it just means that we need to validate the information we have collected.

We have come a long way since the use of the VIEWIT program. The new GIS software and hardware allow for a higher degree of accuracy, much faster processing time and stable printed media. The parts of the GIS program that are less subjective are visibility analysis, distance zones, slopes analysis, travelways etc.

Region 8 is taking the lead with the development of dashboards in progress. Future development of a model that would analyze the landscape based on form, line, color, and texture would reduce the amount of subjectivity that is occurring when determining Variety Class / Scenic Attractiveness. To accomplish such a program

would require that a team of landscape accessors be organized.

Establishing a line for better communication would reduce some of the duplication that is happening, but I believe some of the poor communication that is occurring is because of the sparse number of forests that have GIS. For the interim a small group of users could keep the information flowing until a larger network develops because of project 615.

Develop INAs for VMS and SMS Inventories

In 1993 the Uinta National Forest purchased a UNIX platform computer system with 6.0 Arc/Info software to prepare for the upcoming Forest Plan revision and project 615 implementation. Charles R. Hartgraves stated, "In the Forest Service, . . . we are committed to strengthening our existing decentralized structure by putting this technology in the hands of our field resource managers." (Heit and Shortreid p. v). We have the hardware. The next step is to determine what we need for a Forest wide database.

Region 4 has directed forests to go through an Information Needs Assessment (INA) as a guideline prior to implementing coverages into a permanent database. Using the guidelines established by the Regional Draft 615 Implementation Quality Improvement Team, INAs were completed for both VMS and SMS inventories using existing Forest base coverages. The coverages identified by the Forest were transportation roads and trails, vegetation, landform (DEMs). (For INA comparisons, see Appendix B, and Appendix C.)

Comparison of GIS Base Coverages

The comparison of GIS base coverages is based on the information provided by the INAs of the existing 1980 VQOs and deriving SMS inventories (see Appendix B and Appendix C). It was found that there are similar coverages needed between the two inventories to make them complete, they are transportation system (roads, trails) and the Existing Visual Condition / Existing Scenic Integrity coverages. These coverages play a major role in how management will determine the direction for the Forest.

Transportation routes have change since the completion of the VMS inventories of the 1980's, roads have closed and new routes have been established. Because of these changes new inventories would need to be completed in these areas. The question is which system should be used for these changes? Using the VMS system would be consistent with the 1980 work. But after the inventory was complete we would be in the same situation of converting VMS terms into SMS terms. Thus maintain a static coverage in relationship to Ecosystem management. If we used SMS for these small area conflicts between the two systems could case more problems then work needed to make them compatible.

Existing Visual Condition/Existing Scenic Integrity inventories need to be completed for the entire Forest. There would not be much difference in the two inventories except where Existing Land Use/Themes varied from the natural-appearing landscape of the VMS process. Without going through the SMS inventory phase it would difficult to tell where these conflicts may occur.

The 1980 VQO inventory represents a derived coverage using data that is no longer accessible. After the inventories were completed using the VIEWIT program in the 1980, the next step toward implementation was verification. There has been no verification of the Variety Classes, nor have the VQO inventories been implemented into the Forest Plan as direction.

By using the process described in Landscape Aesthetics, A Handbook for Scenery Management, SMS inventories would be derived by using biotic and abiotic functions of the landscape; i.e.: vegetation, landform, water form and transportation network. Working with other resource specialist alternatives could be developed and final direction could be established for a future amendment to the Forest Plan. Because these coverages would be built from resource coverages, the process could remain dynamic allowing a diverse look at the landscape and the needs of the ecosystem.

Implementation Cost Comparison

Cost of digitizing 1980 VQO, 48" x 72" base,	54* ($75.00)	= $4050.00
Manuscripting, digitizing & verification	80 hrs ($30.00)	= $2400.00
		$6450.00
Cost of deriving SMS inventories	*80hrs (**$100.00)	= $8000.00

Notes: * Represents 8½" x 11" reduced Quads w/ VQOs.
**SMS inventory costs are based on the development of SMS inventory GIS application.

CONCLUSIONS AND RECOMMENDATIONS

The strength of GIS is its ability to integrate data from a variety of sources and disciplines using a common geographical frame of reference. GIS is securing its future in Forest Land Management by providing managers the ability to spatially manipulate data, thus providing a way to "assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings." (National Environmental Policy Act of 1969)

From the research of other processes and my own process the need to develop a standard application became apparent. The application should provide a framework for Forest Service wide application. This should walk the user through the process of the Scenic Management System building coverages as they go until the desired outcome or outcomes are achieved. It should also allow the user to pull from different data sources and coverages, ask for help, input, change and query data, plot maps, run reports, and leave a paper trail that describes the data and processes used.

I would recommend that we not input the 1980 VQOs as a coverage in GIS because it was derived from other coverages that are no longer available and that managers would be determining Forest direction based on 16 year old data. Focusing our attention toward building the other base data coverages could prove to be very cost effective. While waiting for the base data coverages to be developed, directing attention to the existing scenic integrity inventories would provide a sound foundation for determining Forest direction in acquiring the desired landscape character goals.

By building Scenic Integrity Standards from the very beginning we will achieve a flexible position by allowing changes to occur as attitudes and management practices

change. After all, the Landscape Character Goals and Scenic Integrity Standards reflect the interaction of humans with their environment.

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APPENDIX

Appendix A

COMPARISON OF THE SMS AND VMS PROCESSES

INVENTORY PROCESS

Scenery Management System (SMS)	**Visual Management System (VMS)**
Ecological Unit Description Based: National Hierarchical Framework of Ecological Units (1993)	**Character Type** Based: Physiographic sections as defined by Nevin M. Fenneman (1931) Sections Units - Character Types or Subtypes
Existing Land Uses/Themes Based: Human use on the landscape	**No Element**
Existing Landscape Character Based: - Ecological units - Section and Sub-section, Landtype Assoc. - Existing Land Uses/Themes - Constituent Information Combination of the objective information contained with ecological unit descriptions and cultural values that people assign to landscapes.	**Characteristic Landscape** Based: - Character Types or Subtypes Is the naturally establish landscape being viewed. It visually represents the basic vegetative patterns, land forms, rock formations, and water forms which are in view.
Scenic Attractiveness Based: Combination of valued landscape elements such as landform, water characteristics, vegetation, and cultural features. Classification: A - Distinctive B - Typical C - Indistinctive	**Variety Class** Based: Classifying the landscape into different degrees of variety. This determines those landscapes which are most important and those which are of lesser value from the standpoint of scenic quality. Classification: A - Distinctive B - Common C - Minimal

Scenery Management System (SMS)	**Visual Management System (VMS)**
Existing Scenic Integrity Based: - Existing Land Uses/Themes - Constituent Information - Very High, High, Moderate, Low, Very Low, Unacceptably Low A measure of the degree to which a landscape is visually perceived to be "complete."	**Existing Visual Condition** Based: - Retention, Partial Retention, Modification, Maximum Modification, Unacceptable Modification "Current state of visual quality relative to the degree of deviation from the natural-appearing landscape." Visual Management System for the Sawtooth National Forest
Constituent Information Based: Examines the significance of scenic quality and aesthetic experiences to people: - to visitors of a National Forest; - to people as part of the local setting in which they live; - to people living a far distance from the Forest;	**Visitor Sensitivity** Based: Measure of people's concern for the scenic quality of the National Forests.
Landscape Visibility Based: - Constituent Information - Travelways and Use Areas - Concern Levels, 1,2, or 3 - Distance Zones, Foreground, Middleground, Background	**Sensitivity Levels** Based: - Visitor Sensitivity, 1,2 or 3 - Travelways and Use Areas, Primary, Secondary - Major & minor concern of users for the scenic qualities - Distance Zones, Forground, Middleground, Background
No Element	**Proposed Visual Quality Objective** Based: - Variety Class - Sensitivity Level - Distance Zone - Matrix, pg. 43* Outcome, proposed management direction: Preservation, Retention, Partial Retention, Modification, Maximum Modification
Scenic Classes Based: - Scenic Attractiveness, A, B or C - Concern Level, 1, 2 or 3 - Distance Zone, Forground, Middleground, Background - Matrix, 4-15-Landscape Visibility and Scenic Classes Outcome: Scenic Class with a range of 1-7, with 1 being the highest	**No Element**

ANALYSIS AND PLANNING

Scenery Management System (SMS)	Visual Management System (VMS)
Alternative Development and Evaluation Based: - Scenic Classes - Resource Specialists - Public Involvement - Proposed Landscape Character Description and Land Uses/Themes - Proposed Scenic Integrity Level	**Management Review and comments** Based: - Proposed Visual Quality Objectives - Resource Specialists - Public Involvement - Proposed alternative VQOs
Alternative Selection Based: - Landscape Character Land Use/Theme Goals - Scenic Integrity Objectives Outcome: Forest Ecosystem Management Direction, Desired Landscape Character and Land Use/Themes, Scenic Integrity Objectives	**Management Selection** Based: - Visual Quality Objectives Outcome: Forest Management Direction, Preservation, Retention, Partial Retention, Modification, Maximum Modification

IMPLEMENTATION

Scenery Management System (SMS)	Visual Management System (VMS)
Standards and Guidelines Based: - Scenic Integrity Objectives - Landscape Character and Land Use/Theme Goals	**Standards and Guidelines** Based: - Visual Quality Objectives
Mitigation Based: - Existing Scenic Integrity - Existing Landscape Character and Land Use/Themes - Scenic Integrity Objectives - Landscape Character and Land Use/Theme Goals	**Mitigation** Based: - Natural-appearing landscape - Existing Visual Condition - Visual Quality Objectives

MONITORING

Scenery Management System (SMS)	Visual Management System (VMS)
Monitoring Based: - Scenic Integrity Objectives - Landscape Character and Land Use/Theme Goals	**Monitoring** Based: - Visual Quality Objectives

APPENDIX B

UINTA NATIONAL FOREST VQO IMPLEMENTATION PLAN
INFORMATION NEEDS ASSESSMENT (INA)

April, 1994
Revised April, 1996

1. Analysis

1.1 Information Needs Assessment

Management Issue:
Should 1980 Visual Quality Objectives be changed to SMS terms and be digitized as a Forest GIS coverage?

Management Situation:
Currently the derived Visual Quality Objectives for the Forest are maintained in the *Visual Resource Management Implementation Plan for the Uinta National Forest* which are bound 7½ minute series quadrangle maps reduced to ⅞"=1 Mile on 8½" X 11" on Mylar sheets. The implementation plan fulfills part of Forest Plan direction in Recreation (see Forest Plan (FP), *Goals and Objectives Standards and Guidelines Management Practice*, Visual Resource Inventory and Planning, Standard and Guideline Rec-11,

> Inventory visual resource and evaluate as an integrated part of the Forest planning process, addressing the landscape's visual attractiveness (variety class) and public's visual expectation (sensitivity level). Definitive land area of the Forest will have a VQO assigned as part of the management prescription. (Section 3, p. 111)

Activity:
Visual Resources Recreation Goal No. 8. Maintain and protect visual resources on the Forest.

Objective Summary:
1. Prepare a visual resource analysis for projects one year in advance of the preparation of the environmental assessment.
2. Coordinate visual quality objectives with visual absorption capability on all projects. (Section 3, p. 32)

As the Forest transitions into the Forest Plan revision and the use of GIS, the need to determine if Management is still consistent with the 1980 Visual Quality Objectives (VQOs) has become evident. VQOs have not been updated since

1980 except for the Strawberry lands purchase. No comparison has been established to show if improvement has occurred in the Visual Quality of the Forest. With the sensitivity of the public increasing, higher demand for Visual Quality has shown the need to examine the 1980 VQOs and see if they will meet the Forest direction in the next decade.

Information Needs Assessment for 1980 VQOs Uinta National Forest

Issues	Product	Interpretation	Basic Data
Do the 1980 VQOs meet current Forest management direction?	Map: Proposed Management direction compared with 1980 VQOs.	Area/acres preservation, retention, partial retention, modification, max modification.	1980 VQOs, proposed management direction, transportation system 1980 and current.
What roads or trails have been added or deleted to the Forest transportation system since 1980 that are not reflected in the existing VQOs?	Map: Roads/trails added or deleted since 1980.	Comparison of 1980 transportation system (roads/trails) and current transportation system.	1980 transportation system (roads/trails) and current transportation system.
Is the Forest meeting the VQOs established in 1980?	Map: Existing visual condition compared with 1980 VQOs.	Area / acres preservation, retention, partial retention, modification, max modification.	Existing visual condition, 1980 VQOs.

Status Data (1980 VQOs)

Need	Coverage	Type	Scale	Source
1980 VQOs	N	line	1:72411	⅞ = 1 mile, 8½" x 11" Mylar quads, VRM Implementation Plan 1980, manuscripts need to be prepared.
Proposed Management VQO changes	N	poly	1:72411	Manuscripts need to be prepared.
Transportation system (roads / trails) 1980	N	line	1:72411	Roads 48" x 72" Mylar base map at ⅞" = 1 mile. Trails 8½" x 11" Mylar quads. Manuscripts need to be prepared.
Transportation system (roads / trails) current	N	line	1:24000	CFFs, routes need to be identified.
Existing Visual Condition	N	poly	1:24000	Manuscripts need to be prepared.

Coincident Lines

Coincident lines between data layers will be identified prior to any manuscripting, digitizing or analysis. When coincident lines occur, resource specialists, GIS Coordinator will determine which lines will be used.

Map Preparation
The Resource specialist will prepare and verify coverages and tabular data. Layers will be prepared following National Map accuracy standards and Regional standards. Attributes associated with coverages will meet WO standards, where appropriate.

Metadata
Information concerning source, scale, and quality of the data used in the analysis will be documented using R4 Draft Metadata Guidelines.

1.2 Data/Systems/Organizational Requirements

Analysis of data sources:

Forest 1980 Visual Quality Objectives

VQOs were derived in 1980 by using the VIEWIT computer program in Fort Collins and running the digitized files of Variety Class + Seen Area / Distance and merged them *". . . defined by the decision matrix (Agriculture Handbook 462, p. 43), to create visual quality objective-distance zone maps."* Anderson, Mosier, Chandler (p.189). The VQOs maps at 1:72411 (⅞"=1 mile) scale, were transferred manually to Mylar from paper grey scale grid cell maps. The VIEWIT files were created as follows:

Slope

Digital Terrain Tapes from the U.S. Defense Mapping Agency digitized from USGS topographic maps at 1:250,000, accuracy within ±400 feet horizontally and 100 feet vertically.

Sensitivity

Only roads were designated with a sensitivity level, road alignments digitized in VIEWIT by coordinates.

Distance Zone

Derived from road data using an offset.

Seen Area

Derived from road data and Digital Terrain Tapes.

Variety Class

Derived from grey scale slope classification 60%+ = A, 20%-60% = B, 0%-20% = C, and verified using 1971 resource photos 1:15,840

Tasks to be preformed:

Manuscript 1980 VQOs

Process for manuscripting and digitizing maps will be determined by GIS coordinator and Resource specialist.

Proposed Management VQO changes

Derived from 1980 VQOs, Transportation system changes, Existing Visual Scenic Condition inventories. A review will be made by resource specialist with District staff and Forest staff. If insufficient change is noted, 1980 VQOs may be updated and accepted as part of the revised Forest Plan. This information will be manuscripted onto stable base at 1:72411 and digitized into GIS as a Forest coverage.

1980 Transportation system (roads)

The 48" x 72", ⅞"=1 mile base map shows all 1980 existing roads. Primary and secondary roads will need to be determined by the distance zone and sensitivity designation on a map.

1980 Transportation system (trails)

No trails were designated with any sensitivity level nor distance zones. These decisions may change 1980 VQOs because of increased sensitivity.

1994 Transportation system (road / trails)

CFFs are currently being updated to show additions and changes to the transportation system. Map accuracy will be checked, process currently being developed by GIS coordinator, transportation specialist, and the Regional Office, estimated completion date 1996 mid summer. Once completed roads and trails will need to be attributed with desired sensitivity levels / concern levels and distance zones and plotted at 1:172411 and compared with the 1980 transportation system 48" x 72" map.

Existing Visual Condition

Developed from project records, field inventories and resource photos and will be visually transferred to a 1:24000 stable base for manuscripting and digitizing.

Appendix C

UINTA NATIONAL FOREST SMS IMPLEMENTATION PLAN
INFORMATION NEEDS ASSESSMENT (INA)

April, 1994
Revised April, 1996

1. Analysis

1.1 Information Needs Assessment

Management Problem:
What does the Forest need to do to implement the Scenic Management System (SMS) using a GIS platform?

Management Situation:
Preparing for the Forest Plan revision and implementation of GIS, management is looking at ways to show the relationship of humans to the ecosystem. Using SMS inventories as a base coverage will show this relationship. Management will be able to interact with the public and identify the perceived health of the Forest by using existing Scenic Integrity (ESI), proposed Scenic Integrity Standard (SIS) and Landscape Character Goals (LCG).

Information Needs Assessment SMS inventories Uinta National Forest

Issues	Product	Interpretation	Basic Data
What is the geographical reference for Landscape Character (LC)?	Map: Ecoregions Subsections	Area / Acres, Landscape Character / Sub-Type descriptions	Ecoregion, Subsection, descriptive text
What is the defined the Existing Land Uses/Themes (ELU/T)?	Map: Land Use area	Area/Acres, Land use/Theme descriptions	Land Uses / Themes, descriptive text
What is the frame of reference for Scenic Attractiveness (SA)?	Map: Scenic Attractiveness Levels	Area/Acres, Form, Line, Color, and texture	Ecoregion, Subsection, LC, ELU/T, DEMs, Lakes, Streams, Landtype, Rock outcrops, Vegetation
How are the Forest management units (FMU)?	Map: Landscape Units / Watersheds	Area / acres, Watersheds	DEMs
What is the Existing Scenic Integrity (ESI) Level on the Forest?	Map: Existing Scenic Integrity Levels	Existing Scenic Integrity Levels	LC, ELU/T, Aerial Photos, Cffs, DEMs

Issues	Product	Interpretation	Basic Data
What are the concern levels (CLs) for roads, trails, and use areas throughout the Forest?	Map: roads, trails and use areas	Concern Levels	Constituent analysis, CFFs
How much and at what distance can the Forest be seen from roads, trails, and use areas? (DZ)	Map: Seen Area, Distance Zones	Seen Area, Distance zones, Concern Level	DEMs, CFFs, Constituent analysis
Scenic Classes (SC)	Map: Scenic Classes	Area / acres, rating 1-7	SA, CLs, DZ, Roads, Trails
SMS Alternative Development Forest wide	Map: SMS Alternatives	Area/Acres, Alternative	SA, Cls, DZ, ELU, FMU, Roads, Trails, proposed LC, proposed SI
Alternative Selection	Map: Alternative Selection	Area/Acres, Alternative	Same as SMS Alternative

Status Data SMS inventories

Need	Coverage	Type	Accuracy	Source
Ecological Unit Description (EUD), (Ecoregion Sub-section)	Y	poly	?	Ecoregion Sub-Sections / R4 contract
Existing Land Uses/Themes	N	poly/text	1:24000	Land Use maps, CFFs, Aerial Photos
Existing Scenic Integrity (ESI)	N	poly	1:24000	manuscript, CFFs, Use Areas, Project inventories, Aerial photos, Resource photography, slides, video
Scenic Attractiveness - Singular (SA) (Base on Form, Line , Color and Texture)				
Landform - A,B,C (L)	N	poly	1:24000	Derived DEMs, Manuscript
Vegetation - A,B,C (V)	N	poly	1:24000	Derived Timber Stand data, Riparian data, GAP data
Water Form - A,B,C (WF)	N	poly	1:24000	Derived CFFs, Riparian data, Stream inventories
Scenic Attractiveness - Composite (SAC)	N	poly	1:24000	Derived ESS-LCT, SA, L, V, WF
Forest Management Unit (FMU)	N	poly	1:24000	Derived DEMs, Manuscript
Existing Lands Use/ Theme (ELU/T)	N	text	N.A.	Description of ELU/T
Proposed Landscape Character (PLC)	N	text	N.A.	Derived from Variation on Landscape Character
Constituent information (CI)	N	text	N.A.	Derived from constituent inventories / surveys
Roads	N	line	1:24000	CFFs
Trails	N	line	1:24000	CFFs
Use Areas	N	poly, line, point	1:24000	CFFs
Distance Zones (DZ)	N	poly	1:24000	Derived CFFs, Roads, Trails, Use Areas, DEMs

Need	Coverage	Type	Scale	Source
Concern Level (CL)	N	line	1:24000	Derived CFFs, Roads, Trails, Use Areas
Landscape Visibility (LV)	N	poly	1:24000	Derived CFFs, Roads, Trails, Use Areas, DEMs, DZ, CL
Scenic Class (SC)	N	poly	1:24000	Derived LV, ISA-C
Scenic Integrity (SIOs)	N	poly	1:24000	Derived SC, DLC, CI, and Forest Management
	N	poly	1:24000	CFFs, Roads, Trails, Use Area, Project inventories, Aerial photos, Resource photography (slides, video)

Coincident Lines
Coincident lines between data layers will be identified prior to any manuscripting, digitizing or analysis. When coincident lines occur, resource specialists, GIS Coordinator will determine which lines will be used.

Map Preparation
The Resource specialist will prepare and verify coverages and tabular data. Layers will be prepared following National Map accuracy standards and Regional standards. Attributes associated with coverages will meet WO standards, where appropriate.

Metadata
Information concerning source, scale, and quality of the data used in the analysis will be documented using R4 Draft Metadata Guidelines.

1.2 Data/Systems/Organizational Requirements

Quality review of data sets:

Landscape Character Type / Sub - Type

Based on Ecoregion sub-sections as developed by the R4 contractor.

Scenic Attractiveness (SA)

Option 1: Development of a model.
Option 2: Access SA manually and manuscript for input into the GIS system.

Roads, Trails , Use Areas

CFFs are currently being updated to show additions and changes to the transportation system. Map accuracy will be checked. The process for geographically referencing new additions is currently under development. Estimated completion date mid summer 1996.

Existing Visual Condition

Will be developed from project records, field inventories and resource photos and will be visually transferred to a 1:24000 stable base for manuscripting.

Vegetation

Coverage will be made of four existing data sets:

Timber stands	data accuracy 1:24000, status digitized in process of data verification.
Riparian data	accuracy 1:24,000, status identity to be manuscripted.
Range Data	accuracy 1:24,000, status identity to be manuscripted.
Utah Gap Analysis	accuracy ?, status - under revision, complete summer of 1994.
Utah Gap Analysis	source satellite imagery, analysis 60 acre cell size.

Glossary

CFF
Cartographic Feature File - A data file containing the digital representation of all features, except contours, form a PBS map. Features are represented as line strings and points in ground coordinates with attribute information attached.

Coverage
GIS term that describes line, point or polygon layers or drawings.

Dashboard
A term that describes a arrangement of icons on the computer screen that selected will preform macro functions (same as buttons in the windows applications).

DEM
Digital Elevation Model - Points that a provide the X, Y, and Z coordinates for development of contour, slopes etc..

GIS
Geographic Information Systems - A tool to store, analyze, and display data that are geographically referenced (have a known location on the ground) and attributed (have characteristics described).

Manuscript
The process of putting information onto a registered media (mylar) in preparation of digitization into a GIS formate.

SMS
Scenery Management System - Defines a system for the inventory and analysis of the aesthetic value of National Forest lands.

VIEWIT
A computer program develop to operate on the Univac 1180 with Exec-8 operating systems during the 70's that computerized techniques for delineating the terrain visible from a single point or from multiple observation points. The results are produced in either a tabular or in overlay map form.

VMS
Visual Management System - Provides a framework to inventory the visual resource and provide a measurable standards for the management of it.

VQO
Visual Quality Objective - Degree of acceptable alteration of the natural landscape.